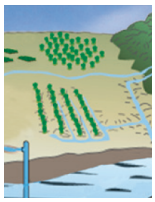
Proposed NASA-ISRO Synthetic Aperture Radar Mission

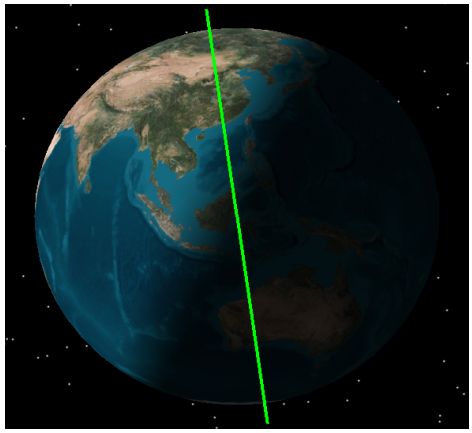


Illuminating Earth's Dynamic Solid Earth, Cryosphere and Ecosystems

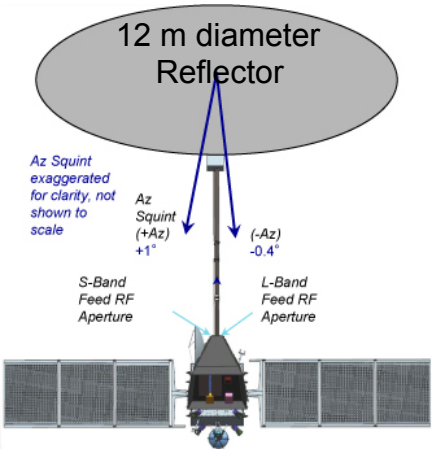
The proposed NASA-ISRO SAR (NISAR) Mission would measure Earth's changing ecosystems, dynamic surfaces, and ice masses providing information about biomass, natural hazards, sea level rise, and groundwater. http://nisar.jpl.nasa.gov

NISAR would observe Earth's land and ice-covered surfaces globally with 12-day regularity on ascending and descending passes, sampling the earth on average every 6 days for a baseline 3-year mission. Proposed Launch Date: 2020



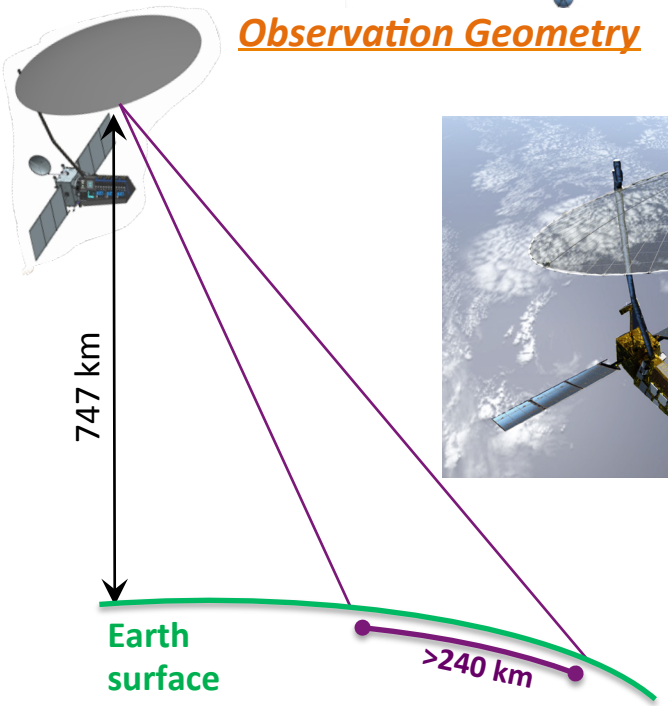
Dawn-dusk orbit

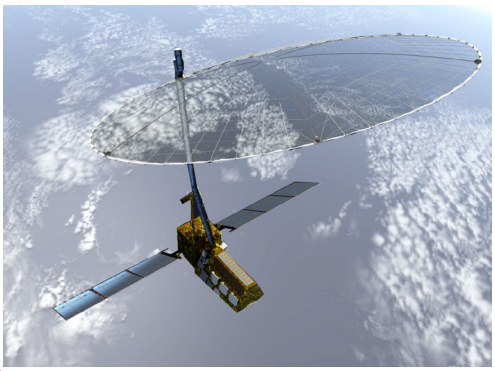
Fixed off-broadside beam-pointing bias



Mission Characteristics	
Orbit Altitude	747 km
Orbit Inclination	98.5°
Repeat Cycle	12 days
Time of Nodal Crossing	6 AM/ 6 PM
Orbit Control	< 500 m
Pointing Control	< 273 arcsec
Pointing Flexibility	Left/Right
Duty Cycle	> 30%
Baseline Mission Duration	3 years
Consumables	5 years
Data and Product Access	Free & open

Observation Geometry



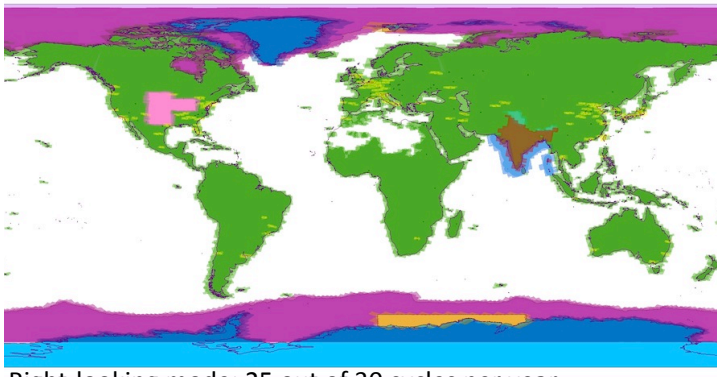


Artist's Concept

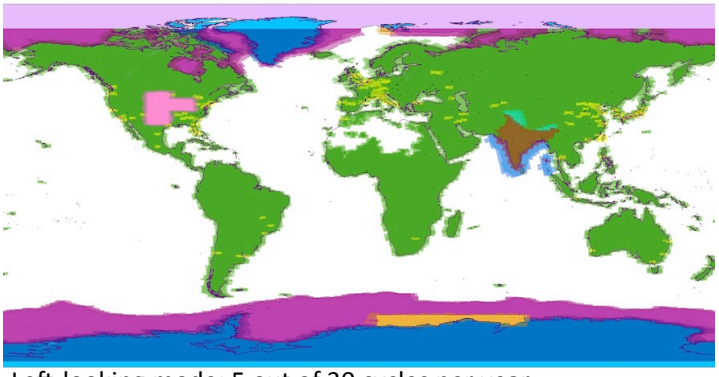
NISAR Project Team
Jet Propulsion Laboratory
California Institute of Technology

Instrument Characteristic	L-band (1215-1300 MHz)	S-Band (3162.5 – 3237.5 MHz)
Available Polarimetric Modes	Single Pol (SP): HH or VV Dual Pol (DP): HH/HV or VV/VH Compact Pol (CP): RH/RV Quad Pol (QP): HH/HV/VH/VV	SP: HH or VV DP: HH/HV or VV/VH CP: RH/RV
Available Range Bandwidths	5 MHz, 20 MHz, 40 MHz, 80 MHz (Additional 5 MHz iono band for 20 & 40 MHz modes at other end of pass-band)	25 MHz, 37.5 MHz, 75 MHz
Swath width	> 240 km	> 240 km
Noise Sensitivity	-27 dB swath average	-27 dB swath average
Ambiguities	< -23 dB swath average in SP or DP modes < -17 dB swath average in QP mode	< -33 dB swath average
Incidence Angle range	33- 47 deg	33 – 47 deg

Observation Strategy	L-band		S-band		Sampling Scheme	
Science Target (colors refer to maps below)	Mode	Res Az x Rg	Mode	Res Az x Rg	Desc. (D) Asc. (A)	Culling Approach
Background Land	HH/HV	7m x 12m			A + D	Culled above ± 60° lat
Land Ice	HH	7m x 3m			A + D	Culled above ± 60° lat
Sea Ice Dynamics	VV	7m x 50m			A + D	-
Urban Areas	HH/HV	7m x 6m			A + D	-
US Agriculture	QP	7m x 6m			A + D	-
Himalayas	HH/HV	7m x 6m	RH/RV	7m x 6m	A + D	-
India Agriculture	QP	7m x 6m	RH/RV	7m x 12m	D	-
India Coastal Ocean			HH/VV	7m x 12m	A	-
Sea Ice Types	VV/VH	7m x 12m	RH/RV	7m x 12m	D	Culled



Right-looking mode: 25 out of 30 cycles per year
Artic Polar Hole: 87.5 – 90 degrees N
Antarctic Polar Hole: 77.5 – 90 degrees S



Left-looking mode: 5 out of 30 cycles per year
Artic Polar Hole: 77.5 – 90 degrees N
Antarctic Polar Hole: 87.5 – 90 degrees S